

# Treatment of Coloured Waters

*"ZENON's nanofiltration technology exhibits very high removal of disinfection byproduct precursors. With the low operator interface required with a membrane based solution as opposed to conventional chemical addition technologies, nanofiltration offers considerable advantages."*

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## THE COMPANY

ZENON Environmental Inc. is an advanced technology company which provides a comprehensive range of environmental and engineering services to industries, consultants, and governments. The company currently employs over 200 people in its offices in Canada, the U.S. and Europe. ZENON's head office is located in Burlington, Ontario where over 45,000 square feet of space is dedicated to office, laboratory, pilot plant and manufacturing facilities. ZENON specializes in providing innovative and cost effective solutions to complex problems.

## THE CHALLENGE

Many surface drinking water supplies are highly coloured. The bulk of soluble organics present in natural water supplies consist of humic materials. These compounds are relatively large molecular weight polar organics that attribute the yellow to brown colour in some surface supplies.

Many small communities in Northern Ontario and Quebec which draw water from coloured surface supplies often have serious problems when chlorinating. In fact, after chlorination, Tri-Halo-Methane (THM) concentrations in these drinking waters can be elevated above the federal guideline of 350 mg/L. Health officials are concerned over the implications these elevated concentrations of THMs in drinking waters.

Providing high quality water to

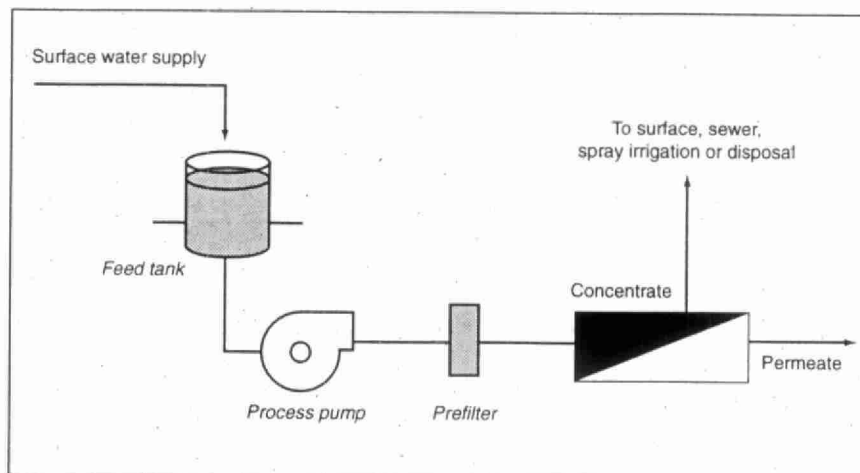


Figure 1 - Schematic of Nanofiltration System

remote communities has often meant using small package plants staffed by skilled operators who must regularly adjust chemical dosages in response to changing feed conditions. Further complicating the process is that the removal of disinfection by-product precursors (DBPs) under these conditions is often difficult. It is necessary to identify and develop technologies which are suitable for small communities and can achieve THM levels at the lowest cost possible.

## TECHNOLOGY DESCRIPTION

The process train is shown schematically in Figure 1. Membrane technology offers a potential solution by removing trihalomethane precursors prior to chlorination. This technology has been widely used for removal of colour from groundwater sources, and

ZENON's new nanofiltration module has now expanded the application of this advanced technology to surface waters.

## RESULTS

Table 1 shows the results of the technical demonstration. The nanofiltration system removed from 50 - 90% of the THMFP (Trihalomethane Formation Potential) from the surface water. High removals were also achieved for colour, TOC and turbidity.

## TECHNOLOGY OPPORTUNITIES

ZENON will continue the commercialization of its nanofiltration technology by undertaking additional demonstration and full scale treatment work. This will generate opportunities for selling other systems. The company is currently seeking suitable candidate sites.

Parameter	Raw Water	Permeate	% Removal
Colour (TCU)	25 - 110	0 - 6	94 - 99%
TOC (mg/L)	1 - 15	0.4 - 3	60 - 85%
THMFP* (µg/L)	50 - 1350	6 - 175	50 - 90%
Turbidity (NTU)	0.3 - 12	< 0.2	92 - > 99%

\*Trihalomethane Formation Potential

Table 1 - Summary of Test Results

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## **PARTNERSHIP IN POLLUTION PREVENTION AND RESOURCE CONSERVATION**

The demonstration of this technology was partially funded by the Ontario Ministry of Environment and Energy.

Industrial companies located in Ontario may seek ministry/ industry services which will help them:

- \* reduce, reuse and recycle solid waste;
- \* effectively remediate historic pollution and destroy hazardous contaminants;
- \* reduce or eliminate liquid effluent and gaseous emissions;
- \* use energy and water more efficiently.

Equipment and services supply companies can benefit from the information provided on technologies identified for business development.

## **FOR FURTHER INFORMATION, PLEASE CONTACT**

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## **MINISTRY OF ENVIRONMENT AND ENERGY SERVICES**

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